Odling, silicon, boron and fluorine compounds; Mr. Fisher, inorganic chemistry; Mr. Watts, organic chemistry; Mr. Veley, physical chemistry; Mr. Marsh, the practice of organic chemistry; Mr. Vernon-Harcourt, the subjects of the preliminary examination; Mr. Elford, groups vi., vii., viii. in Mendeléef's periodic system; Mr. Elford, great chemists and their work; Mr. Walden, synthetical methods in organic chemistry, purin group, &c.; Mr. Wilderman, the velocity of reaction and equilibrium in homogeneous and heterogeneous systems; Prof. Sollas, history of the earth, Jurassic fossils; Mr. Dickson, the atmospheric circulation; Mr. Herbertson, river basins and shore lines; Prof. Miers, elementary crystallography; Mr. Bowman, some natural silicates; Prof. Weldon, general course of morphology, variation, inheritance, natural selection (continued); Mr. Goodrich, annelida; Mr. Jenkinson, elementary morphology; Mr. Günther, arthropoda (continued); Mr. Thompson, sauropsidan morphology, sauropsidan palæontology; Prof. Gotch, general course of physiology, physiology of the excitable tissues; Mr. Haldane and Mr. Ramsden, subjects of the Final Honour School; Mr. Burch, physiological physics; Prof. Vines, elementary course—botany; Prof. Tylor, anthropology in ancient literature; Mr. Stout, mental evolution; Prof. Case, psychology and the origin of knowledge.

CAMBRIDGE.—The Reader in Geography (Mr. Oldham) gives this term three courses of lectures, on the geography of Europe, on physical geography, and on the history of geographical discovery, respectively.

At Corpus Christi College, Mr. F. G. Channon, eighth wrangler, 1897, has been elected to a fellowship.

Mr. W. B. Hardy, Demonstrator of Physiology, has been awarded the Thurston Prize at Caius College, for his physiological researches.

The John Hopkinson memorial wing of the Cambridge University Engineering Laboratory will be opened on Friday, February 2, at 2.30. Lord Kelvin will deliver an opening address, after which the Master of Trinity will unveil a portrait of the late Dr. Hopkinson, presented to the Laboratory by subscribers.

WE learn from the *Athenaeum* that by the will of a wealthy Africander, Dr. W. Hiddingh, the Cape University profits to the extent of 25,000*l.*, with a site for new university buildings, and 5000*l.* for the foundation of a scholarship. The South Africa College receives from the same source a legacy of 10,000*l.*

WE understand that the Berkeley fellowships at Owens College, referred to in a note last week (p. 284), were given only for a limited number of years by a generous friend of the College, and they have now ceased. There has never been an endowment upon which these fellowships were an annual charge.

A BILL "to authorise the regents of the Smithsonian Institution to confer certain degrees and for other purposes" has been introduced by the Chairman of the Senate Committee on the District of Columbia. *Science* publishes the following particulars of the provisions of the Bill:—That the regents of the Smithsonian Institution be authorised to appoint a board of five examiners, who shall, with the approval of the regents, prepare and publish a schedule of courses of studies preparatory to the degrees of master of arts, master of science, doctor of philosophy, and doctor of science. The examiners shall from time to time hold examinations in the City of Washington for the said degrees; and, on the satisfactory completion by any candidate of the prescribed course of studies for either of the above mentioned degrees, shall recommend such a candidate to the regents of the Smithsonian Institution for such degrees. The regents are hereby authorised to confer, under suitable regulations, the degrees above mentioned, and also the honorary degree of doctor of laws. Provided, That no person shall be accepted as a candidate for the degree of master of arts or of doctor of philosophy who has not completed a course of study at least equivalent to the course of study required of candidates for corresponding degrees in the most advanced universities in the United States; and provided further, That the degree of doctor of laws shall be conferred on no more than five persons in any one calendar year. The members of the board of examiners shall hold office during the pleasure of the regents of the Smithsonian Institution. Each examiner shall devote his entire time to the duties of instruction and examination assigned to him by the said regents, and shall receive a salary of 4000 dollars per annum, except that the chairman of the board shall receive a salary of 5000 dollars per annum.

THE inaugural lecture of the Department of Agriculture of the University of Cambridge, delivered by Prof. Somerville, has been published by the University Press. The subject is some aspects of the bearings of education and science on practical agriculture. Ten years ago very little was done for the education of the rural population in the principles of agricultural industries, but many agencies are now at work, and the assistance which science can give to agriculture is slowly being recognised by farmers. The establishment of a chair of agriculture at Cambridge, and its endowment for ten years, should serve to extend the movement for increased attention to agricultural interests in education. When the ten years provided for by the endowment have elapsed, it may confidently be expected that public opinion will see that the chair shall be placed upon a permanent footing. What has to be done between now and then is to show that farmers who use with intelligent discrimination the teachings of science have the best chance of success. Agricultural practice which neglects scientific results is doomed to failure, but if science is engrafted upon practice, it is possible for farmers to hold their own even in these years of depression. "It is the fortune of agriculture," remarks Prof. Somerville, "to be indebted to science at almost every turn. Zoology and physiology play their part in such directions as the breeding and feeding of live-stock, in the various ramifications of the veterinary art, and in the attractive section of economic entomology. Geology affects practical agriculture to a less extent, but no science adds more to the pleasures of a farmer's life. Mathematics and physics lend their assistance in such sections of a farmer's work as the calculation of volumes and areas, in draining, levelling, road-making, the use and maintenance of machinery, and the like." To this may be added that the agriculturist who has a knowledge of the principles of physical and natural science is better able to discern directions in which cultivation may be improved, and to take advantage of the results of agricultural research, than the farmer who does not possess such knowledge. Prof. Somerville's lecture should be widely distributed among agriculturists so as to correct the impression, still too common, that science is theory and that practice is independent of it.

SCIENTIFIC SERIALS.

American Journal of Science, January.—Products of the explosion of acetylene, by W. G. Mixter. The study of the explosion of acetylene was continued in order to obtain facts for or against the author's hypothesis that a sufficient frequency of molecular impacts is requisite to secure spread of explosive change throughout a gas. The experiments so far are not conclusive. Acetylene is always found after sparking and explosion. The author believes that it is not residual gas, but is formed by subsequent synthesis. This is supported by the fact that an endothermic compound of carbon and nitrogen is also formed in the eudiometer.—Glaciation of central Idaho, by G. H. Stone. The occurrence of wood in the esker gravels of Idaho suggests a comparison of that region with New England. The large valley ice sheets or Piedmont glaciers of north central Idaho formed a type intermediate in character between the more strictly local glaciers found further south and the great confluent ice sheet of British Columbia.—Graftonite, a new mineral, by S. L. Penfield. The mineral described is found on the south side of Melvin Mountain, about five miles west of the village of Grafton, New Hampshire. It is an iron-manganese phosphate closely analogous to triphylite, with which it is found intergrown.—Explorations of the *Albatross* in the Pacific Ocean, by Alexander Agassiz (see p. 211).—Constitution of the ammonium-magnesium arseniate of analysis, by Martha Austin. When ammoniacal magnesia mixture in slight excess is added to the faintly acid solution of arsenic acid (carrying no ammonium salts) in a volume not exceeding 200 c.c., the precipitate appears to fall in ideal condition.

Symons's Monthly Meteorological Magazine, January.—Low barometric pressure on December 29, 1899. The notes refer to the readings along the remarkable course of the storm, which took first an easterly track along the south of Ireland, and then suddenly changed it to a northerly one over the Isle of Man.

The minimum seems to have been about 28·1 inches; at Camden Square, London, where the lowest reading was 28·247 inches. The only lower readings there since 1858 have been: 28·332 inches on January 24, 1872; 28·364 inches on December 4, 1876; and 28·295 inches on December 9, 1886.—Severe frost in December 1899. A table shows the number of shade minima below 15°. Near Hereford a temperature of −2° was recorded on the 15th in a screen of the Stevenson pattern. At Lyme Regis, Dorset, a correspondent writes that some soda-water bottles which were opened on the golf links all instantly froze; before being opened they were perfectly fluid and free from ice.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 7, 1899.—"*Polytremacis* and the Ancestry of the Helioporidæ." By J. W. Gregory, D.Sc. Communicated by Prof. Lankester, F.R.S.

The recent blue coral *Heliopora* presents striking resemblances in structure to the palæozoic *Heliolites*. All the earlier writers on corals accordingly regarded the two genera as intimately allied But some later authorities consider the resemblances as accidental, and that the corals have no special affinities. Thus, according to F. Bernard, *Heliopora* and *Heliolites* belong to distinct subphyla. Lindström admits only one species of *Heliopora*, and regards the genus as quite isolated, as essentially distinct in structure from *Heliolites*, and as further separated from the latter by "the total absence of all connecting links from the end of the middle Devonian to the recent times." The author, however, considers that the original view of the close affinity of *Heliopora* and *Heliolites* is correct, that the two genera are essentially similar in structure, and that they are linked by a series of eocene and cretaceous corals. Amongst these fossils is the genus *Polytremacis*, which is redescribed, and a new species of *Heliopora* from the cretaceous of Somaliland. It is suggested that *Heliopora* has descended from the palæozoic Heliolitidæ by degeneration in size and increase in number of the cœnenchymal cæca.

"On the Association of Attributes in Statistics, with Examples from the Material of the Childhood Society, &c." By G. Udny Yule. Communicated by Karl Pearson, F.R.S.

Geological Society, January 10.—W. Whitaker, F.R.S., President, in the chair.—On a particular form of surface, the result of glacial and subaërial erosion, seen on Loch Lochy and elsewhere, by Dr. W. T. Blanford, F.R.S. This form of surface, first noticed by the author on Lake Como, was afterwards observed in the Great Glen of Scotland and in British Columbia. It consists of an almost even plane sloping at a moderate or high angle, and cut at intervals by small ravines or channels. The sides of the Great Glen have been planed by glacier-action to a greater extent than usual, and between Loch Lochy and Loch Oich, near Laggan, the sides of the Glen have a regular and flat slope of over 35° up to about 1000 feet above sea-level. Numerous stream-cut channels draining down this slope are, on an average, not more than 10 to 15 feet deep, but some quite exceptional examples may be 50 feet deep; these channels occupy less than a fourth of the surface. In addition there are larger glens which, although they run out into shallow ravines where they cut the sloping side of the Great Glen, are frequently 500 feet in depth among the hills. If these were ordinary stream-valleys before the Glacial Period, the cutting away of the ridges separating them to the extent of at least 250 or 300 feet must be attributed to glacial erosion on the sides of the Great Glen. The erosion of the small ravines in the glacial slope must have been effected by streams in post-Glacial times, and the measurement of their rate of erosion might be expected to throw light on the amount of time which has elapsed since the Glacial Period in this district. "The general effect produced by the whole evidence is . . . the small amount of denudation that has taken place since the Great Ice Age, and the necessary deduction that no great period of time, measured in years, can have elapsed between the Glacial Epoch and the present day."—On the geology of Northern Anglesey (Part II.), by C. A. Matley.—The formation of dendrites, by A. Octavius Watkins. If two plane-surfaces be separated by a film of suitable plastic material, and one surface be rotated slowly on the other through a small arc, the plastic material collects into branching forms similar to the structure of dendrites. The dendritic form starts from the part farthest from the axis, and the flow of material is from the smaller to the larger branches, the smaller uniting to form the larger. The author explains dendritic structure by the formation of a fissure in rock which becomes filled with a thin film of dendritic material; if the fissure is slowly widened, the dendrite starts where the widening commences, coinciding dendrites being formed on each wall.

Royal Meteorological Society, January 17.—Annual Meeting.—Mr. F. C. Bayard, President, in the chair.—In his presidential address, Mr. Bayard discussed the meteorological observations made at the Royal Observatory, Greenwich, during the fifty-one years 1848–1898, and brought out in a novel way many interesting features in the variability of the various observations of the barometer, maximum and minimum temperatures, relative humidity, direction of the wind and rainfall. These were shown in a diagrammatic form on the screen by means of a number of lantern slides. The address was also illustrated by various views of the Royal Observatory and of the instruments employed.—Mr. G. J. Symons, F.R.S., was elected President for the ensuing year.

PARIS.

Academy of Sciences, January 15.—M. Maurice Lévy in the chair.—On the distribution of the abnormal residues of a function, by M. H. Padé.—On the reduction of an algebraical problem, by M. J. Ptaszycki.—Determination of the invariants attached to the group G_{168} of M. Klein, by M. A. Boulanger.—Vector fields and fields of force. Reciprocal action of scalar and vectorial masses.—Localised energy, by M. André Broca.—On the distribution of potential in a heterogeneous medium, by M. A. A. Petrovsky.—On the co-volume in the characteristic equation of fluids, by M. Daniel Berthelot. A comparison of the experimental isotherms for carbon bisulphide, ethyl chloride, carbon dioxide and ethylene with various modifications of the Van der Waals formula. If the co-volume b be regarded as a function of the temperature, the Van der Waals equation can be made to represent well the liquid state. The formula proposed by the author is $b_1 = b_c\left[1 + 0{\cdot}3\left(\frac{T}{T_c} - 1\right)\right]$, where b_T is the co-volume at T, b_c that at the critical temperature, T_c.—On the mechanism of hearing, by M. Firmin Larroque. For a simple sound, whether the wave phases are concordant or not, the centre of perception receives two transmitted impressions together, there being no interference in any case. For two simple or complex sounds, two corresponding impressions are received by the centre of perception, there being neither beats nor resultants, the two ears being acoustically distinct.—The permanent modifications of metallic wires and the variation of their electrical resistance, by M. H. Chevallier. If the resistance of a wire is R at a temperature T_0, then heated to T, and again measured at T_0, in general, the resistance R′ last measured will be different from R. The phenomenon appears to be due to a tempering effect, and is most clearly marked with metals and alloys that have not been hardened. The effect is very marked with ordinary platinum-silver wire.—On the Hall phenomenon and thermomagnetic currents, by M. G. Moureau. The thermomagnetic currents discovered by Nernst and Ettingshausen in 1886 to exist in a thin metallic plate placed in a magnetic field normally to the lines of force and traversed by a heat current. Several attempts have been made to explain these phenomena, by hypotheses resting upon numerous arbitrary assumptions. The author now shows that these results are an immediate consequence of the Hall effect, the values calculated from this point of view agreeing extremely well with the experimental numbers, except in the cases of nickel and cobalt, which require further investigation.—On the discharge of electrified bodies and the formation of ozone, by M. P. Villard. The author concludes from his experiments that in ordinary air incandescent bodies may emit kathode rays comparable to the Lénard rays, but of very low voltage. If this is the case, several distinct phenomena can be explained; the power of discharging electrified bodies possessed by flame, incandescent bodies and phosphorus; the discharge by ultra-violet light, the production of ozone by flames, incandescent bodies, oxidation of phosphorus, electric sparks, and by radium.—On a method of measuring the velocity of the Röntgen rays, by M. Bernard Brunhes. The ordinary methods of measuring the velocity of light cannot be used with the X-rays since they are not reflected, but by applying the discovery of M.